

## 6.—Larks, *Mirafra javanica*, of tropical Western Australia

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On the basis of freshly collected material the distribution and geographical variation of *Mirafra javanica* in Western Australia is discussed in greater detail than was possible by Mayr & McEvey (1960), to whose paper the present one may be regarded as complementary.

### Introduction

In their important paper on distribution and geographical variation of *Mirafra javanica*, Mayr & McEvey (1960) suggested further field studies. They also discussed the application of ternary nomenclature in the species and some other matters.

From May till August, 1960, my assistant, Mr. A. M. Douglas, and I visited the northern part of Western Australia. We paid special attention to *Mirafra*, and collected 39 specimens, many of which are from localities whence the species had not previously been recorded. This resulted in a much improved knowledge of the distribution of the various colour-types, including the discovery of a very rufous population in the Kimberley Division. I have thus been able to extend the information given by Mayr & McEvey and to discuss some of the questions raised in their stimulating paper.

The first draft of this paper was sent to Dr. Mayr and Mr. McEvey, to both of whom I am indebted for useful comment and criticism, much of which has been incorporated. I have to thank Dr. D. Amadon (American Museum of Natural History) for the loan of four topotypical specimens of *Mirafra javanica melvillensis*. Mr. R. Vollprecht, of the Perth Weather Bureau provided me with the 1960 rainfall figures for Wyndham. Finally Mr. Douglas and I want to express our sincere gratitude to the many friends whose hospitality contributed so much to the success of our stay in the Kimberley Division.

### Distribution, Habitat and Habitat Preference

*Mirafra javanica* is widely distributed in the North-West Division from Minilya northwards, and in the Kimberley Division (Fig. 1), and there is no doubt that its distribution is continuous or nearly so. The occurrence seems to be governed by the presence of seeding soft grasses, the seeds of which are (at least in the months May till August over which my experience extends) its main and perhaps its only food. In stomachs I found exclusively seeds of at least two different species of grasses, though unfortunately these were not preserved for identification.

In the Kimberley Division, larks occur not only in the open fields and paddocks with rather low and small soft grasses, but also in the very

high *Heteropogon contortus* in open savannah; usually, however, as solitary specimens, never in great numbers, and never in the denser types of savannah-woodland.

The preceding notes on habitat do not conflict with my earlier statement that the distribution of the species is continuous or nearly so, for open savannah and open fields are so common in the Kimberley Division that for practical purposes they may be regarded as a continuous habitat. This is supported by the fact that at every place visited by us in the Kimberley Division we found larks. It may be noted that Mayr & McEvey (p. 163, 164) do not seem to be quite clear about the position. They loosely use the word "isolates" for several of the populations, but contradict this by saying ". . . . . that *subrufescens* . . . . . is essentially an inland race tending to intergrade with the coastal isolates around it in the west". Mr. McEvey wrote me that the term "isolates" was partly used as a substitute for "subspecies", mainly to avoid continuous repetition of the words subspecies and race. Personally I would prefer not to water down the term isolate as this is likely to cause confusion.

Whenever I observed larks, I have made notes on the colour of the soil, and feel justified in stating—contrary to what is said of certain species of larks in Arabia and the Kalahari Desert—that they show no particular preference for soils corresponding in colour with the colour of their own plumage. When going to alight, the birds are clearly guided exclusively by the presence of seed-bearing grasses, quite irrespective of the colour of the soil.

This does not mean, however, that any idea of correlation between colour of soil and colour of larks should be abandoned. In much of the Kimberley Division the rocks are of a reddish-brown colour, consisting of reddish sandstone and red weathered basalt. All true plains, on the contrary, have a greyish-yellow colour. At Beverley Springs and Kalumburu, though some of the paddocks where one finds the greatest concentration of larks are greyish-yellow, the country is hilly so that the greater part of it is reddish-brown in colour—and so are the larks in these places. Going from Beverley Springs over Mount House to Glenroy, the larks become slightly paler in colour. But Glenroy is an enormous plain. At Wyndham the hills consist of red sandstone and their erosion products are just as red as the reddish-brown sand found in localities where rust-coloured larks occur. However, the most conspicuous feature of the country near Wyndham are the extensive grey flats, the estuarine plains of several rivers, and it is to that colour that the larks are adapted. As a generalisation, therefore, I would say that

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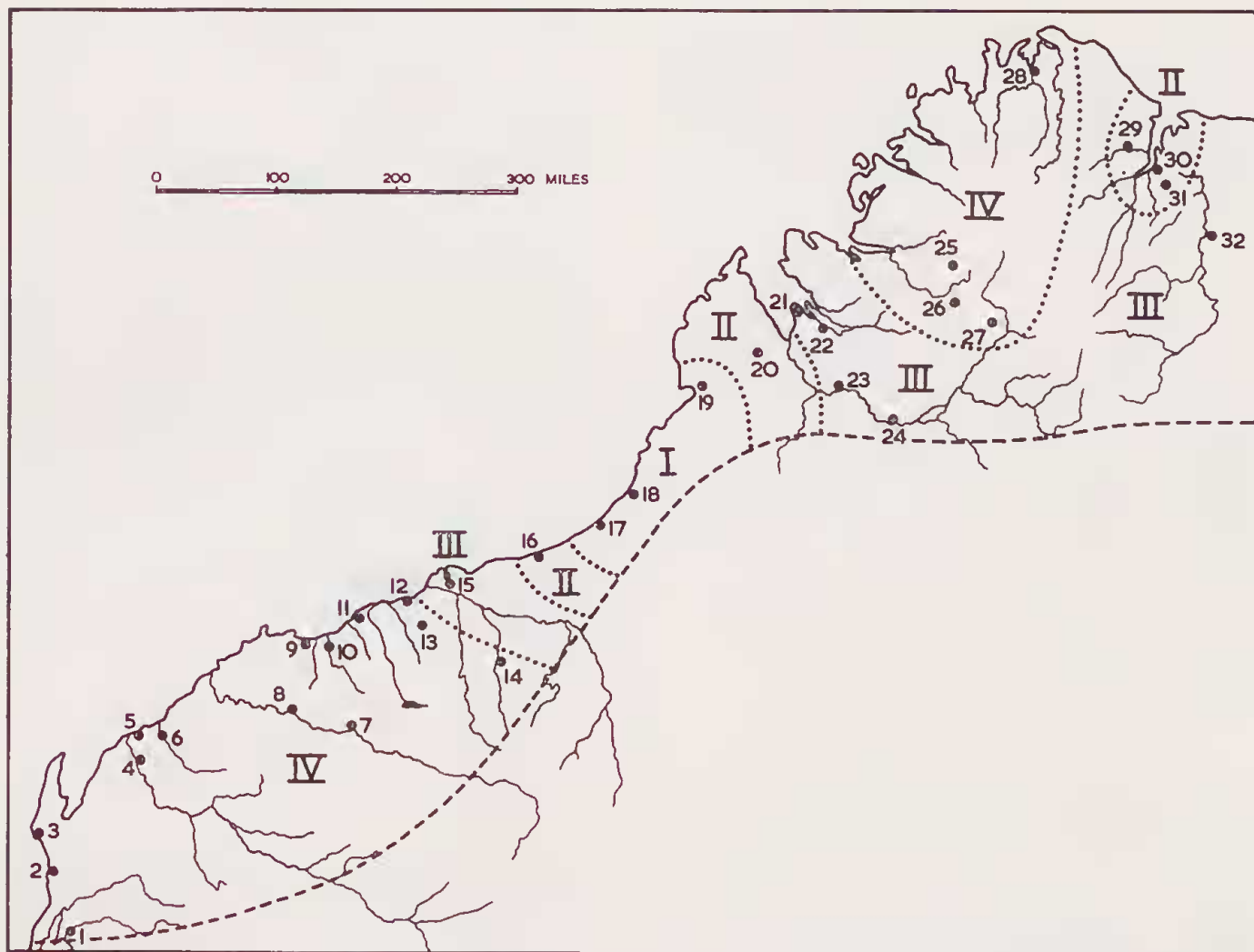


Fig. 1.—The distribution of *Mirafra javanica* and its colour types in Western Australia. Localities: 1, Minilya; 2, Maud's Landing; 3, Point Cloates; 4, Munderoo; 5, Onslow; 6, Cane River; 7, Coolawanyah; 8, Millstream; 9, 14 miles east of Roebourne; 10, Sherlock; 11, Mundabullangana; 12, Port Hedland; 13, Tappa Tappa; 14, Marble Bar; 15, De Grey; 16, Pardoo Sands, 116 mile peg; 17, Wallal, 30 miles beyond homestead; 18, Anna Plains Outcamp; 19, Roebuck Bay Plains, Broome; 20 Broome-Derby Road, 85 and 88 mile pegs; 21, Point Torment; 22, Meda; 23, Liveringa; 24, Noonkanbah; 25, Beverley Springs; 26, Mount House; 27, Glenroy; 28, Kalumburu; 29, Forrest River; 30, Wyndham; 31, Parry's Creek; 32, Argyle (Ord River).

in hilly or mountainous areas rusty coloured larks may be expected, in lowlands yellowish-grey larks. The very rufous *M. j. woodwardi* of the hilly North-West, and the pale *M. j. halli* of the plains near Broome, further support this assumption.

In view of the extreme paleness of the race *halli*, special attention was paid to the colour of the soil in its range. The coastal area along the Eighty Mile Beach where we found and collected larks consists of pale yellow dune sand. Near Broome the coastal strip is also pale, but it does not extend far inland and patches of brownish and reddish soil occur very near the town as I could ascertain when flying over the area. This suggests that along the Eighty Mile Beach the species does not range far inland, but is confined to the pale coastal strip. The coastal sands south-west of Port Hedland (Mundabullangana) are just as pale as those near Broome, but the larks there have behind them the great reservoir of rufous larks from the hilly Pilbara District so that any local selective influence would be undone.

Dr. Mayr has pointed out to me that the situation in Australia is probably not directly comparable with that in Africa, as there the contrast between the substrates is exceedingly great. Rich red rocks will meet along a geological fault line almost snow white limestones. Elsewhere, black lava flows will meet whitish sands. The differences in soil colour found in the north of Western Australia are certainly far less striking. Nevertheless it is worth pointing out that in Australia no preference for soils which correspond in colour with the plumage of the birds seems to have developed, and in fact, this is one of the questions posed by Mayr & McEvey.

Mayr & McEvey (p. 190) enquire about the possible significance of habitat colour (general colour of a paddock of seeding grasses) as opposed to ground colour. As far as I have been able to make out, this colour, which in the seeding season is pale yellow, has had no influence as a factor contributing to the colour of the birds. This is not surprising when one considers the fact that *Mirafra javanica* is essen-

tially a ground bird, so that cryptic coloration, to be of any advantage, has to agree with the colour of the ground, rather than with that of its vegetation. Moreover, habitat colour is presumably identical in all parts of the range (though seasonal variation from green to yellow probably occurs), and if it has any effect, this will be difficult to detect because it would work in exactly the same way throughout the range. Also there seems to be a preference for small open places or places with scanty vegetation—more about this in the section on behaviour.

#### Miscellaneous Notes on Behaviour, etc.

Towards the end of July, 1958, I found the larks at Millstream and Coolawayah stations in full song. Early that month there had been heavy rainfall in the district and during the last days of the month more rain fell; I mention this because of the possibility that sexual activity is stimulated by rainfall, as has been shown in other Australian bird-species (cf. Keast 1959). Some notes on the behaviour of the birds during rain were published previously (Mees 1961).

During our trip, we did not hear any song until on my last day of field work in Wyndham, July 31, 1960, when one or two birds were in full song. This evidently was the first song of the season because for a week I had been visiting the same localities almost daily, and had not heard any song. Rainfall in Wyndham during 1960 was: January 897 pts., February 814, March 928, April 223, May 347, June till October nil, November 250, December 460.

Apart from the singing birds in Wyndham, the only noise I heard from larks in the period May-July 1960 was a short double note uttered in flight: "pitpit . . . . pitpit . . . .".

When preparing specimens collected I have taken notes on size of gonads, state of ossification of skulls, and condition of moult, the results of which are tabulated. In all specimens of which the sex could be determined the gonads are small to very small; this is particularly striking in the males, for in adult females the normal size of a resting ovary is apparently about 5 mm, which is fairly large; but none of the females had enlarged oocytes. In the specimens of uncertain sex, the gonads were pre-

TABLE I

Locality	Date	Sex	Gonads	Ossification skull	Moult
14 miles N. of Roebourne	22.V.1960	♂	small, 2 mm.	fully ossified	body feathers
Mundabullangana	23.V.1960	♀+♀+♀+♀	?	fully ossified	body feathers and tail
Pardoo Sands	25.V.1960	♀+♀+♀+♀	very small, 2½ mm.	partly ossified	no moult
" "	"	? imm.	....	....	....
Broome - Derby Road, 85-mile peg	1.VI.1960	?	....	fully ossified	moult
Broome - Derby Road, 88-mile peg	1.VI.1960	♂	tiny, less than 1 mm.	largely unossified	moult
Kalimburu	14.VI.1960	? imm.	....	partly ossified	heavy moult
"	2.VII.1960	♀+♀+♀+♀	tiny, 3 mm.	....	....
"	1.VII.1960	♀+♀+♀+♀	fairly large, 6 mm.	fully ossified	primaries, no moult in body feathers
"	24.VI.1960	♀+♀+♀+♀	small, 1½ mm.	fully ossified	heavy moult primaries
"	19.VI.1960	♀+♀+♀+♀	fairly large, 6 mm.	fully ossified	wings
"	27.VI.1960	♂, ♀, ♀	small, 1 mm.	fully ossified	primaries and rectrices
"	12.VI.1960	♂	fairly large, l. testis 3½ mm., r. testis 2½ mm.	fully ossified	....
"	14.VI.1960	? imm.	....	partly ossified	heavy moult
"	24.VI.1960	♀+♀+♀+♀	small, 1 mm.	fully ossified	wings
Beverley Springs	19.VII.1960	♀+♀+♀+♀	fairly small, 5 mm.	not completely ossified	....
"	"	♀+♀+♀+♀	tiny, less than 1 mm.	fully ossified	....
"	11.VII.1960	♀+♀+♀+♀	fairly small, 3½ mm.	fully ossified	....
"	19.VII.1960	♀+♀+♀+♀	small, 1½ mm.	fully ossified	....
"	13.VII.1960	♀+♀+♀+♀	fairly small, 4½ mm.	fully ossified	....
Wyndham	25.VII.1960	♀+♀+♀+♀	fairly small, 4½ mm.	fully ossified	....
"	31.VII.1960	♀+♀+♀+♀	fairly small, 5 mm.	fully ossified	body feathers, heavy tail moult
"	25.VII.1960	♂, ♀	small, 1 mm.	fully ossified	....
"	26.VII.1960	♂, ♀	fairly small, 2 and 2½ mm.	fully ossified	....
"	28.VII.1960	?	....	fully ossified	....
"	25.VII.1960	♀+♀+♀+♀	small, 4 mm.	partly ossified	....
"	28.VII.1960	♀+♀+♀+♀	fairly small, 5 mm.	fully ossified	....
"	26.VII.1960	♀+♀+♀+♀	fairly small, 5 mm.	fully ossified	....

sumably so small and inconspicuous that they could not be found. Unfortunately I failed to obtain a singing bird at Wyndham; it would have been interesting to compare the size of its gonads with those of non-singing birds. My observations fit in with McEvey's (1960) statement that the only months in which breeding of *Mirafra javanica* in Australia has not been recorded are May, June, July and August.

Many of the specimens show moult. Examination of the condition of ossification (or pneumatization) of the skull enabled me to check whether the plumage characters hesitatingly claimed by Mayr & McEvey (p. 156-157) to be diagnostic of young birds, do hold. I found that the character of the pale edges to the crown feathers, which gives the crown a more or less scaly appearance, is apparently a valid one. As regards the outer edges of the primaries, allegedly wider in young birds, there is certainly a tendency to this, but the difference is not very convincing.

The way to observe larks is to walk criss-cross over likely-looking country (e.g., places covered with soft grasses) until one is flushed. The flight is slow and with characteristic fairly short wing-beats. Usually they alight nearby. The birds are to be found on small open or less densely covered places, rather than in the densest grassland. This probably is also the reason that quite often we found them near cattle—where the vegetation had been trampled down.

Partly this preference for certain places may be responsible for the concentration of birds one often sees in a very limited area, but on the other hand larks are definitely social. Not only did I observe repeatedly how flying larks joined each other, or would even be joined by those that had been standing on the ground, but also when a number were flying about at a time, and one alighted, others would alter their course and alight near the first individual.

There is no doubt that when not in song the birds are rather inconspicuous. When singing they inevitably make their presence known widely. When not singing, however, they stick to the ground, and will not fly up until disturbed. Hence, the casual observer may easily overlook them even in paddocks where they are common.

Several authors, of which Bourke (1947) may be mentioned in particular, have drawn attention to the amount of mimicry in the song of *Mirafra javanica*; Bourke even states: ". . . . that mimicry forms the bird's 'normal' song during the breeding season, and that from February until September (approximately) the song of the species consists of a short double note—merely a call-note". This call-note is evidently identical with the one described by me on a previous page—in my opinion it is incorrect to call it song. As regards the song, Bourke is certainly right that much of it consists of imitation, but the statement that mimicry forms the song definitely goes too far.

I have no notes on mimicry in Australia, but did hear it from the nominate race, *Mirafra javanica javanica* Horsfield, in Java. For example, on 29.VI.1947 near Buitenzorg, West

Java, I noted that there was apparently much mimicry in the song, and that the ordinary call of *Pycnonotus aurigaster* (Vieillot) could easily be recognised in it. Another time I recognised the call of *Caprimulgus affinis* Horsfield and the song of *Prinia inornata blythii* (Bonaparte), both imitated almost perfectly (Tjibarocsa, West Java, 2.VII.1949).

### Geographical Variation

The colour varies from rufous to white on under-parts, and from black to grey, with the edges of the feathers varying from rufous to white, on the dorsal surface. In the Northern Territory there is a population (*söderbergi*) with a very black back, and little rufous, but in Western Australia the black-grey seems to be more or less correlated with the rufous-white series, and does therefore not need a separate discussion. I distinguish the following colour types:—

- (i) No rufous at all except some pale brown along the outer edges of the primaries; under surface creamy white; back grey. The white extreme.
- (ii) As (i), but a very slight admixture of brownish on the back; under surface cream.
- (iii) More brownish than (ii) both above and below.
- (iv) All the feathers of the dorsal surface with dark rufous borders, under surface cinnamon. The rufous extreme.

In Fig. 1 I have tried to indicate the approximate ranges of these four colour types in Western Australia. The figure also shows very clearly the difficulties of practical classification one encounters when trying to deal with these populations trinomially. Going from Roebourne along the Pardoo Sands to Anna Plains, one covers the whole zone of intergradation between the rufous *woodwardi* and the pale *halli*; from Broome going north-east via Derby to Beverley Springs one encounters the same gradual change in opposite direction, from *halli* to *melvillensis*.

The three races mentioned, *woodwardi*, *halli* and *melvillensis* are extremes, hence there is no problem in applying trinomially. We come now to colour type (ii) however. This is at Pardoo Sands and between Broome and Derby merely an intermediate—or a product of intergradation—between (i) and (iii) which, for practical purposes, should not be named\*. Near Wyndham, on the other hand, an indistinguishable population occurs which is not an intermediate, but forms the end of a gradient of a decreasing amount of rufous in the plumage.

\* Admittedly the Pardoo Sands at the 116 mile peg, where we collected larks of an intermediate coloration, are a pinkish mixture of the red sand of the interior with the whitish sand of the dunes; hence one might argue that the larks at this locality are intermediates because they live on a soil of intermediate coloration, and not because of their intermediate geographical position between *woodwardi* and *halli*.

At the 85 and 88 mile pegs on the Broome-Derby Road, where intermediate larks were collected, the soil is pale yellowish with a pink tinge due to a very slight admixture of red sand.

To colour type (iii) the same pertains as to colour type (ii); it is another intermediate: between Roebourne and Pardoo Sands and near Derby a product of intergradation between (iv) (*woodwardi*) and (ii), but at Argyle perhaps an extreme in the rufous direction as no more rufous population is yet known to exist near that place (it is very well possible that the range of the *melvillensis*-like population extends in an easterly direction to south of Wyndham, but no material is yet available).

It must be realised that my division of the larks in four colour types (as far as amount of rufous in the plumage is concerned) is purely arbitrary. With equal justice I might have divided them in six or eight types. Also as far as my experience goes, the gradients are perfect: the boundaries indicated between the various colour types again are arbitrary which means that specimens here ascribed to (ii) which have been collected near the range of (i) are pale, whereas specimens nearer to (iii) are more rufous.



Fig. 2.—Grass plains at the 85 mile peg on the Broome-Derby Road, habitat of *Mirafra javanica* subsp. (colour group II). 1. VI. 1960.



Fig. 3.—Grass plains at Beverley Springs, habitat of *Mirafra javanica melvillensis*. 19. VII. 1960.

Colour type (iii) corresponds to what Mayr & McEvey call *subrufescens*, a race they give a continuous range from the De Grey River

area in the west to the Gulf of Carpentaria in the east. At De Grey it appears as an intermediate between *woodwardi* and *halli*, near Derby as an intermediate between *halli* and *melvillensis*, west of Forrest River it remains to be discovered as an intermediate between "*forresti*" and *melvillensis*, south of Wyndham (Argyle Downs) it may occur as a soil-adapted population of its own accord, not as an intermediate. It looks as if Mayr & McEvey's *subrufescens* is not the widely-ranging subspecies these two authors thought it to be, but consists of a series of geographically unconnected populations, each of which has a different history.

#### Some Principles of Nomenclature

Mayr & McEvey, discussing the geographical variation of *Mirafra javanica*, correctly stress the fact: "that it is quite impossible to express this complex variability adequately in terms of orthodox subspecies". It is perhaps right to state that I am a strong believer in the ternary system of nomenclature, and the fact that it is sometimes inadequate does not in my opinion mean that the whole ternary system must be rejected. I would even go farther and say that Linnean nomenclature, with its present-day implications of relationships, is only useful when one clearly realises that classification, which inevitably is limited to a small number of systematic categories, is of necessity arbitrary, even though we may call it a natural system. Our whole knowledge of speciation and evolution confirms that there are all stages of intermediates between our artificial classes, and that, indeed, no two pairs of species or other systematic categories stand in exactly the same relation to each other. Once this is clearly recognised, Linnean nomenclature can be used with much advantage.

Mayr & McEvey have named populations, even though very similar populations might occur in other parts of the range of the species, a method they defend as follows (p. 188): "Mention has been made of the inadequacy of orthodox nomenclature . . . and it is merely added here that their treatment will partly depend upon whether one looks at them from the viewpoint of the taxonomist or the student of evolution. To the taxonomist identical populations (i.e., polytopic subspecies) must be given the same name. To the student such a terminology would seem to obscure the fact of the independent evolution obviously involved". However, they add: "In the present cases the majority of individuals in a given race are distinguishable from the majority in the parallel form". As our whole system of nomenclature is based on morphology, it would, indeed, be undesirable to abandon the generally accepted provision that a form, to deserve a place in nomenclature, must be morphologically recognisable.

It seems to me that nomenclature tends to take too important a place in many systematic publications. Systematic ornithology should be concerned with the description of actual variation as found in nature, rather than with the

#### PLATE I (opposite)

Upper figure, *Mirafra javanica halli*, after a specimen from Anna Plains Outcamp. Lower figure, *Mirafra javanica melvillensis*, after a specimen from Kalumburu. Figures of approximately natural size.



